Distr. LIMITED

ID/WG.444/1
18 June 1985

ENGLISH
Original: FRENCH

United Nations Industrial Development Organization

Forum on the Involvement of NGOs in the Implementation of the Programme for the Industrial Development Decade for Africa *

Abidjan, Ivory Coast, 27-30 August 1985

THE INVOLVEMENT OF NGOS IN THE DEVELOPMENT OF BUILDING MATERIALS INDUSTRY IN AFRICA **

Prepared by

Abraham OUATTARA ***

Michel TITECAT ****

---

* Organized by the United Nations Industrial Development Organization (UNIDO) in co-operation with the Association of African Development Finance Institutions (AADFI).

** The views expressed in this document are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. Mention of firm names and commercial products does not imply the endorsement of the United Nations. This document has been translated from an unedited original.

*** UNIDO Consultant, Director in charge of Building Materials.

**** Chief, Research Department (Buildings and Engineering Works).

V.85-28129 (EX)

1. INTRODUCTION

From the outset, the market for building materials in Africa appears divided into two well-defined sectors.

The first is the so-called "modern" sector, which includes civil engineering works, administration buildings and blocks, offices, banks and shops of the European type, high and medium-standing housing, industrial plants and infrastructures, etc.

The second sector is that of housing for the bulk (90 per cent) of the urban population and for nearly all the rural inhabitants.

The different characteristics of these two sectors are sufficiently well known, and they have been so extensively studied that it is unnecessary to dwell on them at length here. It will suffice to recall the main elements that are relevant to our present study:

(1) Building materials peculiar to the modern sector have a higher value added per unit.

(2) Conversely, the materials needed to build housing for the majority of the people are bulky and have a low value added per unit (cement, sheet-iron, sand).

(3) With respect to investments, the industries of the modern sector which provide finishing materials and fittings differ from those engaged in structural construction because of their limited capital intensiveness, which corresponds to a strategy of short or medium-term depreciation.

(4) The two most important materials as regards Development, because they appear at all levels (infrastructure, industry, buildings) are cement and steel - the latter basically in the form of sheets for roofing. Their production requires heavy investments which cannot be written off in less than fifteen to twenty years.

These are, in our view, the factors which have determined the choice of investments during the past two decades.

The products in which industrialists have so far taken an interest are marked by the following features:

(1) A high incidence of transport costs.

The products are usually bulky and/or cumbersome. This is an important advantage when setting up a local industry.

(2) A moderate capital intensiveness

This factor is often decisive in the present context of shortage of investments. Its effect is all the more marked for "high risk" countries. New international investments in the past fifteen years have been marked by a distinct inclination to avoid long-term commitments, with an emphasis on immediate profitability. Moreover, the consequent reduction in the share of fixed costs makes for a better adaptation to the fluctuations in demand, which are of great magnitude.

(3) A high value added rate.

Investors tend to chose materials with a greater relative value added, with a view to ensuring profit margins wide enough to off-set the often irregular operation of the distribution networks.

(4) Adequacy for the markets of the modern sector. The main attraction of these markets is their solvency. There are other advantages, such as the security assured by the traditional distribution networks, the fact that the characteristics of the demand are better known, the convenience afforded by the ease of transfers of know-how or of equipment and the ready access to financing, in particular for suppliers of machine-tools and semi-finished products.

It was in this way that there developed in West Africa immediately after independence such industries as clinker grinding units, brickworks, tile-manufacturing, carpentry works, aluminium factories, etc.

The general strategy of import substitution focused on this modern sector, whose spectacular growth continued until the end of the 1960s. This is also the sector which has recently experienced one of the worst recessions.

This is one of the reasons for the partial failure of the strategy for the development of building materials, a strategy which banked primarily on the modern sector and relied on the fall-out on the peripheral sector (the more important one).

The other basic cause for that lack of success is connected with the failure to integrate the policy of large-scale investments in civil engineering works into a scheme for the setting up of a local production apparatus.

2. BUILDING MATERIALS IN AFRICA

2.1 Present and future demand.

Present-day Africa is marked by a very poor level of equipment and an exceptionally high birth rate in absolute figures whose effects are aggravated by existing difficulties in the agricultural and food sector (migration pressures) and by a very large rural exodus potential, due to the low urbanization rates prevailing at present.

The needs for equipments, infrastructures and housing are accordingly considerable and generate a demand which greatly exceeds the productive capacity of the African industrial apparatus. This demand centres on two main products: cement and steel.

To these may be added, in order of decreasing importance: wood, aggregates and sand, and petroleum by-products.

The main features of the production of these various elements will be examined below.

By way of general comments, it may be pointed out here that the problem of the inadequacy of resources to meet existing needs ought to be solved primarily by drawing inspiration from the strategy adopted by the developed countries when faced by the petroleum crisis. The problem in question can be effectively solved by the optimization of consumption by means of maximum utilization.

More precisely, it can be asserted, for example, that the improved utilization of cement will in due course have the effect of developing its production.

2.2 Resources and production apparatus

The production of building materials requires:

(1) financial resources;

(2) raw materials;

(3) energy resources;

(4) human resources;

(5) technical equipments;

(6) distribution networks.

It is worth while to examine, albeit cursorily, these various factors, confining ourselves however to the main products among those mentioned above.

(1) Financial resources

With regard to cement and steel, the initial investment required is of very great magnitude. Accordingly, cement works are few and African production of clinker is very much below existing needs.

Similarly, the steel industry has had a very limited development south of the Sahara, particularly since the share of transport costs is low - which means that the African steel industry has to face a strong international competition.

To this must be added the propensity of investors to seek investments that can be written off on a short-term basis - a thing which is compatible only with the production of wood derivates and of petroleum products. This is true also of the light metallurgical industry (conversion into semi-products).

The heavy metallurgical industry, on the other hand (i.e. rolling mills, plants for the processing of billets and semi-products) is more difficult to operate profitably and there have been a number of failures in this field.

More generally, the paucity of the industry's own financial resources has heavily penalised the major industrial plants processing products for which large-scale operation is a decisive factor in the manufacturing process (steel, clinker).

Large-scale production by industrial units has also an effect on the cost of transport infrastructure. An analysis, and a quantitative study, remain to be made of the costs and burdens resulting for the community, in the context of a comparative assessment of production structures which involve large-scale concentration and hence a heavy distribution network.

(2) Raw materials

Cement

With regard to cement, the necessary clay and limestone are usually available. It should, however, be noted that there are vast areas, in West Africa particularly, without any calcareous sedimentations, a fact which could inspire doubts regarding the choice of cement. This is the case with Ivory Coast where there are no limestone deposits suitable for clinker production, even in mini-cement works.

Steel

As for the iron and steel industy, iron ore deposits are not very widespread, although existing resources are sufficient to meet present demand (Liberia, Mauritania, Angola, Sierra-Leone, Guinea, Morocco, Egypt). Actually, iron ore is not the only problem with regard to the iron and steel industry; coal - converted into coke - must also be available.

Modern methods of handling and carriage by sea have brought down transport costs considerably; the steel market is accordingly highly integrated and competitive on a world-wide basis.

Steel production has accordingly lost the strategic importance which it previously had. The choice of location for it is now based more on the availability of good handling and transport facilities and the existence of a sufficiently well-structured local market (metallurgy of semi-finished and finished products).

Aggregates and sands

The cost and relative importance of these two materials vary considerably. These are products with a large share of local added value because production costs are limited to extraction, handling and transport operations, because they are bulky products and because their initial cost is low (extraction charges). It is of crucial importance to determine the optimum transportation distances. The ideal solution would be for extraction sites to be widely dispersed - a thing which is unfortunately not always the case.

Wood

The situation and prospects with regard to the wood industry vary considerably in Africa from one sub-region to another. While the tropical

belt of Africa may be considered as one of the most important potential producers of raw wood, other vast regions (Sahel, North Africa and southern Africa) are markedly deficient in wood resources. Inter-African integration of the wood industry therefore seems a priori highly recommendable. It should be recalled here that wood production in Africa is subdivided into three main branches: fuel wood, wood for building and wood manufacture (handicrafts, furniture, etc.). The promotion of wood for use in building, since it has a higher value added rate compared to the use of wood as fuel, should make it possible to carry out campaigns for the conservation and revitalization of forest resources and for reafforestation (hence the strategic importance of the so-called secondary, or rapid growth, tree species).

Petroleum by-products

Petroleum, and, more generally, hydrocarbons, are considered here not as energy products but as raw materials for the sector of industry producing plastics and other derivates (bitumens, resins, varnishes, paints, etc.).

Consumption for these purposes is much smaller (6 per cent) than that connected with energy production.

In addition, the high value added rates and the convenience of bulk transportation make for competitiveness and wide distribution of semi-products. The market for these products, like that of steel, is quite competitive and highly integrated on a world-wide basis. Here also, the target is the creation of a final conversion industry (piping, sanitary equipment, varnishes, paints, etc.).

(3) Energy resources

Energy costs are very high for the two basic materials: cement and steel. They are lower for the other materials (wood, hydrocarbon by-products). The energy content of aggregates and sands is moderate but varies considerably with the transport distances.

In all the cases considered, a strict husbandry of energy resources is imperative. Efforts must be focused on the optimisation of manufacturing processes, the accounting of physical costs for purposes of distribution and lastly - and chiefly - savings in materials with a high energy content (steel, cement).

The foregoing is particularly true for certain areas of Africa which are completely dependent on outside sources of energy, and in which the development of building industries could bring about a veritable haemorrage of foreign exchange.

(4) Human resources

The building trade is a great consumer of labour and is also largely dependent on the quality of its actors' know-how.

The building materials industry, on the other hand, is closer to heavy industry in its specific characteristics with regard to human resources. This is at least the case for large cement works and for the iron and steel industry. The position is different with regard to the wood industry, and to small and medium-sized metallurgical plants. Here, the needs for training are vital in a field where the challenges are greater and the products have a high value added rate.

The situation differs greatly from one country to another but the optimum levels required are rarely attained, in particular as regards technicians and executives.

This is a challenge of fundamental importance in which the intervention of a qualified NGO would be welcome.

(5) Technical equipments

Two criteria are of prime importance in this respect: size and sophistication. In other words, on the one hand the quantitative aspect, which is inter-related with financial, infrastructure and distribution problems, and, on the other hand, the qualitative aspect which harks back to the problem of human resources and to that of technology.

This leads us to recent discussions on the subject of adapted technologies, to studies on the effects of large-scale operation, and the problems of the transfer of technology and know-how.

We will deal with these various questions below by reference to the specific cases of the cement, metallurgy and wood industries.

(6) Distribution networks

Once the manufacturing process is completed, it is necessary to manage in the best possible manner the factors involved in ensuring that the products

reach the utilization stage. With regard to the physical aspect of distribution, the generally bulky and/or cumbersome nature of building materials must be borne in mind.

Production may be split up among many small units, in which case transport problems are transferred upstream to the supply stage; alternatively, production can be comparatively centralized in large units in order to benefit from the advantages of large-scale production, in which case there are even greater problems in the matter of financing and transport logistics.

Independently of the purely physical and technical aspect of distribution, there are at least equally important implications with regard to the financing of stocks, marketing and management.

Malfunctioning is frequent in distribution networks, which are sometimes ill-adapted to the real conditions of contemporary Africa. These networks are sometimes still rooted in the trading post tradition or, conversely, adhere exclusively to the organizational pattern of the monosectorial distribution chains peculiar to the commodity trade of the developed countries.

This latter trend was a viable and performing one so long as the building trade appeared as the veritable motor of growth but this is no longer the case in many countries.

It may well be that the setting up of well-adapted distribution networks represents a major challenge for the role of the NGOs in the development of the building materials industry and in making low-cost building materials available to the population.

3. THE NGOs IN THE BUILDING TRADE IN WEST AFRICA

3.1 Framework and direction of the study

Specialized publications contain numerous evaluations of the actions undertaken by the NGOs, especially in the field of low-cost housing and renewed urban tissues.

A systematic study still remains to be made, however, of the structures, objectives, financing and areas of operation - present and contemplated - of the NGOs active in Africa. It must also be added that there are only a few references to actions in the realm of the manufacture of building materials,

in Africa at least. It has, however, been possible to study the activities performed by the Association for the Development of an African Architecture and Town-Planning (ADAUA), in particular with regard to lime (small kilns) and plaster.

We have also undertaken a parallel series of discussions of a prospective character with a number of NGOs with a potential interest in building materials although active mainly - as most NGOs - in the fields of agriculture and training.

3.2 International financing and action of the NGOs

The undoubted (and growing) audience enjoyed by the NGOs is due in part to the support of international development assistance agencies which have found an answer to many of their problems by acting in partnership with them.

The actions undertaken - both multilaterally and bilaterally - by development assistance agencies are more often than not strictly financial in character. The control of the projects and the utilization of the funds is more often than not local, even though a more structured assistance can be furnished with regard to the assessment of needs, the conception of projects, the provision of executive staff, training, etc. This option is a fundamental one in the context of an international co-operation directed towards the enhancement of economic independence.

In this case, the natural partners are the various institutionalized technical and economic services. These services usually operate within an administrative pattern of thinking - sometimes an exacerbated one - which is hardly compatible with projects which are often marked by urgency or which comport elements of innovation.

Financial excess costs can reach high levels and technical or economic performance will then suffer considerably. Development financiers have accordingly adopted a dual approach:

(1) To support key institutionalized agencies by means of training assistance, the sending of experts and the supply of equipment.

(2) To use the NGOs on a provisional stop-gap basis, in the framework of a strategy focused on training and the promotion of appropriate industries.

The flexibility of operation of the NGOs and the certainty as to the motivation of their members, often mean that they can become instruments of development that are immediately operational. Their low operational costs, their mobility and their specialization constitute further attractions.

On the other hand, the action of the NGOs often runs into difficulties in the realm of structure-building. Counterpart problems connected with the projects are not always properly mastered. The NGOs suffer from the defects that correspond to their very qualities. Thus, their great mobility is off-set by less integration in the real factors of the operation of the autonomous economic agents.

3.3 The local institutionalized services and the NGOs

Relations between the two can sometimes be very tense because NGOs often enter an area, or remedy a gap (or alleged gap), in an institutionalized technical, administrative or economic service. Distrustful relations may ensue, which can only be remedied when the relevance of the action of the NGO is perceived, as well as its competence and its deliberate policy of promotion and training, without any thought of perpetuating its action.

In addition, the non-profit-making character of the objectives of NGOs makes it possible to overcome many hesitations.

3.4 Privileged fields of action

In a spirit of urgency, the main NGOs have focused on actions for the production of housing for the underprivileged.

These actions have taken place at two levels: directly at the level of execution and participation, and indirect actions, so to speak - i.e. actions concerned with technical training, assistance to self-building and setting up of co-operatives.

Subsequently and in the same logical process, efforts should be directed towards direct production, upstream in the building industry.

It can be observed that the action is directed more towards:

(1) The designing and promotion of alternative technologies which demand less imported tools and raw materials, involve more know-how; stabilized earth, plaster, etc.

(2) The adaptation of architecture, town planning and urban techniques to the African modes of life.

(3) The promotion of the production of intermediate commodities: lime, geocement presses, tools, etc.

Although the experience of certain NGOs (such as ADAUA and Volunteers for Progress) in the realm of building is impressive, their action as regards building materials is much more modest.

It operates with regard to the production of substitute binding materials to replace Portland cement.

Thus, a number of lime kilns have been developed which produce on a small scale lime that is of inferior quality but nonetheless adequate. Production costs, on the other hand, are quite high and the product is competitive only in areas sufficiently remote from the modern production circuits.

Moreover, these kilns use wood as fuel, so that if the technology were to develop, it would lead to problems in the countries of the Sahel.

To our knowledge there are no mini-cement works.

4. PROSPECTIVE ASSESSMENT AND PROPOSAL FOR ACTION

4.1 The production of building materials

We will not deal here with specific actions which may take place in one or other very particular sectors but which play only a marginal role with regard to building costs. Accordingly, in order to avoid diluting our account we will confine it to the main products: cement, steel, aggregates, wood and petroleum by-prodicts; we will also include intermediate products which account for the major part of employment: masonry blocks, roofing sheets, piping, etc.

(1) Cement

The cement industry proper comprises two distinct phases: the manufacture of clinkers (firing of the clay-limestone mixture) on the one hand, and the grinding and conditioning of the cement on the other, with the possible addition of slag, pozzolanas, filler, etc.

The first phase usually involves nowadays very large industrial investments, combined with the very sophisticated technologies indispensable

to guarantee the quality of products and the optimization of costs, in particular energy costs. The large cement plants have thus accomplished spectacular progress immediately after the petroleum crisis of the previous decade.

However, despite the performances of this industrial apparatus, the final cost of the product is too high bearing in mind the financial capacity of the bulk of potential users in Africa.

It must be noted here that cement, its production and its use, constitute decisive elements in all development strategies, at least in the foreseeable future.

Cement plays a part not only in the production of housing but also in the realm of infrastrucute, of large and small equipments and of industrial and agro-industrial plants.

Projects for the substitution of cement have for the time being remained essentially at the exploratory stage.

The policy followed by India and China appears more appropriate. It rests, among other things, on the promotion and manufacture of "low-grade cement".

This type of cement conforms to adjusted standards which are less strict and can be met at less cost by means of appropriate technologies and with smaller investments. More importantly, they demand less in the way of technology transfers from abroad.

These cements cannot cover the whole range of existing needs and it is still essential to import Portland cement to some extent. Nevertheless, they are well suited for a vast range of uses, housing in particular (except for large housing projects).

If we examine now the second phase of cement production, namely that ranging from grinding to conditioning, the question arises whether a restructuring of the industry may not be desirable in some cases, by breaking up and dispersing the grinding units.

This would make it possible, upstream, to take advantage of the difference between the transport costs for clinker and cement respectively.

Downstream, it would make distribution networks shorter, with, as a direct consequence, savings with respect to conditioning and would also have all the advantages connected with manufacture to order.

This option would of course necessitate accompanying actions by the NGOs in the field of training and in working out guiding and dosage techniques for small plants, and hence help to control problems of quality.

(2) Binding materials as a substitute for cement

The main product for consideration under this heading is lime. Modern technologies for its manufacture are very similar to those of cement. Prices in the international market are also not very different. Lime has the advantage at the beginning of the manufacturing process (low firing temperature, use of limestone exclusively). At the latter stages, however, the advantages connected with transport and storage of clinker are uppermost.

Accordingly, the price of industrially-produced lime becomes very high as soon as the distance of transport increases. This explains why in a great many countries of Africa small-scale production of lime persists and remains competitive, its main problems being quality and energy consumption.

It is therefore appropriate to try to promote, wherever possible, the passage from small-scale production (with its heavy consumption of wood as fuel) to semi-industrial production in mini straight kilns. This process has the advantage of being adapted to small-size limestone deposits, such as the faluns which are the only sources of limestone in many countries of West Africa.

There again, there is a considerable potential role for the NGOs to play in the optimization of the process, in training and in quality management. Actually, there is already activities in this direction. Mention can be made in this respect, for West Africa alone, of those undertaken by ADAUA in Senegal, Mauritania, Burkina-Fasso and Mali.

There are also interesting prospects regarding the re-use of this lime by a second firing in a home-made kiln, using as fuel agricultural wastes, such as rice hulks, which are rich in silicon; as a result, this by-product of home firing acquires the characteristics of hydraulic binding materials.

With regard to substitutes for cement, mention should be made of the experiments under way with plaster, gypsum and sulphur.

We enter here the realm of R + D (Research and Development) operations, for which the stakes are very high but whose action is less immediate - so that they do not come within the effective purview of NGO action in the traditional sense.

Governmental, para-Statal and private research agencies remain very active in this field. There is a dual target, which has already been the subject of extensive discussion in international meetings, for ensuring an improved performance:

(1) To improve the dissemination of information and to undertake a concerted action on the part of the various actors: research institutions, universities, industrialists and financiers.

(2) To promote integrated actions: research innovation - experimenting - dissemination.

In our view, the NGOs could play a decisive role in the final stages of the second process, because of their capacity to adapt themselves to conditions on the spot.

(3) Steel, metals

We have already drawn attention to the characteristics of the metal industry. At the stage of manufacture of metals and semi-finished products, it seems very difficult to escape the logical consequences of the world market for the industry: heavy capitalist concentration and marked vertical and horizontal integration.

If one examines more particularly the finished products, roofing sheets account for the bulk of the market. This is the basic material for a simple technology which is well-integrated in the know-how network. The development of a local industry is closely bound up with the ability to control quality. For in the long run, the major problem will be how to combat corrosion effectively: hence the importance of galvanization operations, for example.

(4) Wood

Wood for building is of course an industry which begins with forestry and forest exploitation. The problems connected with the development of

forest exploitation are well known, as also the threat which hangs over the conservation of forest resources. The promotion of secondary rapid-growth tree species should bring about an improvement in two ways:

(1) A direct effect, by replacing forest exploitation by forest management.

(2) An indirect effect, by involving the populations in the production and profits of this industry.

The social value of the forest heritage would be thus enhanced; in many countries, this is a vital challenge.

Important technical research has been conducted into the secondary tree species, in particular in Africa by the Tropical Forest Technical Centre. There can be no doubt as to the possibility of using these woods for building purposes, both for structural elements and framework and for woodwork and formwork. The studies now under way - which are important - deal with optimization. The development and dissemination stage, which will follow, is an essential one.

A great many NGOs have a wealth of experience in rural and agricultural matters and could naturally make an essential contribution to this action.

The wood industry comprises another area which offers a promising field for development activities: it is that of cutting up, sawing and treatment operations and the manufacture of plywood, fibreboard and laminated (glued) wood.

This is a field in which the structure of investments favours the needs and possibilities of the developing countries. But here too the challenges in the matter of training constitute a decisive factor. The choices made with regard to equipment in machine tools must be such as to avoid resort to very sophisticated machinery to carry out all operations. In addition, the maintenance and utilization of the equipment must be rapidly transferred to the local staff.

The problems peculiar to the manufacture of wood components are perfectly similar. It would be of advantage to dispense widely the carpentry workshops for building materials, in order to benefit from the advantages connected with low-cost transport for cumbersome products. Actions to supply

managerial skills must necessarily include an in-service training in the management of stocks and orders, as well as of the financial constraints connected with them.

4.2 The utilization of building materials

It is essential to realize that the promotion of a building materials industry presupposes a utilization of those materials which is both rational and conducive to savings. This is all the more so where the national economy is in the process of development. Building materials are not consumer goods; they are intermediate products. Their over-all competitiveness can only be assured where the means for a rational and performing utilization exist.

Economic assessments and development projects must therefore adopt an integrated approach, embracing even the making of the final product: building, engineering works, road, etc.

The role of the NGOs can be very important provided the actions undertaken are strongly integrated and associate not only the financiers and industrialists but also the designers and producers of the works. The NGOs which have a good experience of achievements and experimental workshops could be the driving force for the major part of this process, in particular by activating relations between the various actors.

The studies now under way on the optimization of the use of building materials are very advanced in many fields. The need is generally realized to move from natural-size experimentation to the stage of dissemination. Many programmes have already embarked on this course.

There appears, however, to be a lack of co-ordination between the professionals of the building trade and those of industry. It would probably be of advantage to be able to involve those two sectors in the projects and in co-ordinated action.

Another important aspect is that of the adaptation of specifications, standards and regulations to conform with actual needs. This is perhaps the most decisive action, and one which would make it possible to improve housing conditions for the underprivileged. The most striking case is that of cement. This product often possesses qualities greatly in excess of what would be strictly necessary - a situation which is detrimental to economic performance.

It is therefore logical to replace it by a lower-quality product. This enterprise, however, can be dangerous unless accompanying measures are taken for the purpose of avoiding all mishaps in the process of implementation.

The success of these new products depends on several types of action:

(1) An action in the matter of research

By using value analysis methods, the various research agencies can aim at a number of modifications in the products, in order to adapt their qualities to existing needs. These objectives once defined, research into substitute products must be effected by means of consultations between the technical and economic experts on the one hand, and between the industrialists and prime contractors on the other, in order to ascertain the feasibility of the industry as a whole, from the supply of raw material to implementation and satisfactory operation in the course of time.

These actions are not new in Africa and a number of projects are well advanced: wood industry, stabilized earth industry, plaster, stone, etc. Many research laboratories have already acquired a solid reputation in these fields of activity.

There is, however, one dark spot in this encouraging picture and it relates to the circulation of information, to consultation and to regional, sub-regional and sometimes even national co-ordination.

An action on the part of specialized NGOs would thus be timely, even if confined to the circulation of information.

(2) An action in the matter of experimenting and dissemination

The problem of moving from the laboratory to the actual works is often a crucial one. Despite all precautions and preliminary studies, the final application of the new products raises a whole series of problems, in particular that of the dissemination of the new know-how and that of the sociological acceptance of any innovation.

This brings us to the challenge of the multi-disciplinary approach; only those actions which are fully and consciously integrated have any real chance of succeeding without involving any technical, economic, financial, social, public health, etc. drawbacks.

The examples in this respect are many and well known.

The NGOs working in the field often possess a multi-disciplinary network of abilities either within each organization itself or through contacts with other NGOs.

They thus have a major accompanying role to play - potentially at least - in the dissemination of the products of the building materials industry.

Their action must, however, be clearly understood as being absolutely provisional in character and pride of place must be given to the question of counterpart staff and to problems of transfer of know-how.

(3) Support from the administration authorities

This support is indispensible in the developing countries, in view of the frequent weakness of the economic fabric, the production apparatus and the market structure. This support can be direct, in the form of financing, of tax concessions, of promotion and supply of managerial staff, of training, etc. It can, however, also be merely indirect, through the enactment of relevant regulations and standards, support for co-ordination activities, or administrative facilities. This second group of measures is clearly more important than might be thought at first sight.

It can be of decisive importance in connection with an intervention by an NGO.

4.3 Distribution of building materials

We must stress once again the importance, complexity and, in one word, the strategic relevance of the distribution of building materials, i.e. of the process starting at the production unit and ending at the site of works where the materials are delivered.

As we see it, there is here a vast field of studies to be undertaken:

(1) Economic studies

Transport costs in general are the subject of important research work but the particular case of building materials - which are bulky or cumbersome - undoubtedly deserves special attention both with respect to means of transport and infrastructures as with respect to storage and handling equipment.

(2) Commercial studies

In view of the low value added content and the small profit margins, the trade in building materials experiences difficulties which are often difficult to solve locally.

(3) Financial studies

As is well known, suppliers' credits play an important role in building activities, because building materials are in effect intermediate products utilized more often than not by the Contractor, who is an economic agent possessing limited financial resources of his own.

A study of existing distribution networks would reveal the extreme complexity arising from the co-existence - and overlapping at various levels - of modern networks which are the outcome of the large trading firms and traditional networks born of the pre-colonial era - which are still very much alive - as well as the networks which were set up during the colonial period and which have undergone a complex process of evolution, that started with the original stage of the trading post and tropical goods traffic.

These studies, until now perhaps somewhat neglected, could point the way to substantial savings, through the elimination of the malfunctioning and excess costs arising from the multiplicity of intermediary agents; they should lead basically to the promotion of better-adapted networks, etc.

In addition, certain concrete measures can be envisaged already - measures in which the NGOs could easily become involved.

(1) Financing and negotiation of the purchase of materials

The aim of this action would be to promote, guide and train buying co-operatives which would have the advantage of shortening the circuits, reducing management costs, strengthening negotiating positions and opening up prospects of financing, particularly on concessional terms.

(2) Guidance and training for small traders

This is a traditional task of assistance and training for management - of which there are a great many examples and the usefulness of which does not need to be demonstrated.

(3) Banks of materials

The action of these banks, which is more direct, should serve to off-set, where this is necessary, the defective operation of distribution networks. Financed with assistance funds, these banks would not be intended to last; they could in due course be converted into co-operatives.

On occasion, these banks could perform a not inconsiderable role in the struggle against speculation.

4.4 General prospects of action

By way of conclusion, we may stress the need for the NGOs to shun policies of direct intervention on the work sites. Measures of this kind bear too great a resemblance to substitution of the production agents in the building trade; they are bound to be sterile if the counterpart problem is not fully and completely solved.

Assistance could with advantage be directed towards supporting the independant economic agents. This assistance would focus on co-ordination, guidance and training. It should be extended also to various fields connected with building and industry.

Concern with the multidisciplinary approach is a fundamental matter. That approach covers a multitude of aspects - social, financial, technical, commercial, pedagogical, etc.

In this way, the chances would be increased of seeing NGO action fully integrated in the life of the economy.